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SEPTEMBER—OCTOBER 1986
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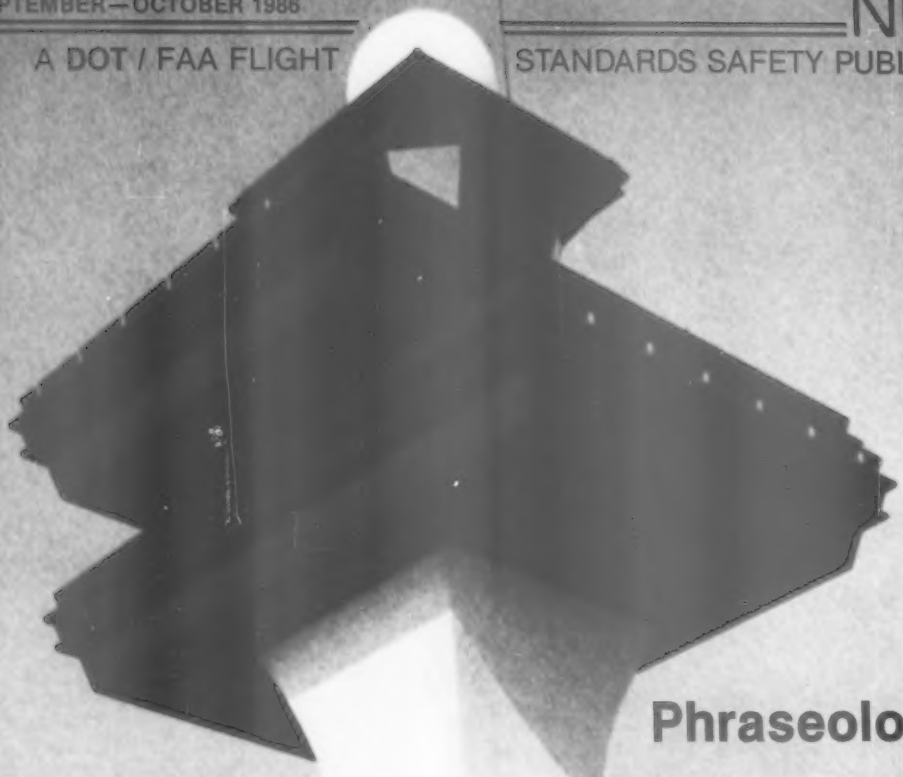

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BRIEFS

MOGAS. Pilots using automotive fuel in aircraft for which the appropriate supplemental type certificates have been obtained are cautioned about accepting such fuel if it has been in long term storage above ground and exposed to high temperatures. These conditions are conducive to gum formation, which may lead to engine malfunction.

Testing at FAA's Technical Center also indicates that carburetor icing will occur in less time and at higher ambient temperatures with automotive gasoline than with Avgas. Further, it is recommended that for aircraft fueled with autogas the availability of full power should be determined before takeoff, if the aircraft is heat-soaked from a strong summer sun or from hot-day ground idling.

REDEYE PROBLEMS. Red interior lighting can create a problem at night for pilots over 40. Inability to focus well on instruments or charts (i.e., near vision) in red light is an early form of weakening visual acuity, which may occur while the individual still has no difficulty focusing in white light. For this reason some aircraft manufacturers are changing from red interior lighting back to white.

WANTED: A FEW GOOD PERSONS. Beginning September 2, 1986 and continuing indefinitely, FAA is opening its register to hire aviation safety inspectors at the GS-9/11/12 level. Positions to be filled are general aviation and air carrier operations inspectors, general aviation and air carrier airworthiness inspectors, avionics airworthiness inspectors, and manufacturing inspectors. If you think you might be qualified or are interested, write to DOT/FAA, Mike Monroney Aeronautical Center, ATTN: AAC-80 (GAN), P. O. Box 26650, Oklahoma City, OK 73126. Ask for announcement #FAA/ASI-005, which will provide all the information you need to apply. Good luck!

PASS IT ON. As much as we know that no one can stand to be parted from a copy of FAA GENERAL AVIATION NEWS, try passing your issue on to less fortunate pilots. You can xerox articles you wish to keep, but if "spreading the wealth" is too much for you to bear, at least pass on the subscription form. Thanks, and read on!

GROUND COLLISIONS

These "earthly" mishaps also require pilots to see and avoid

Midair collisions and near midair collisions between aircraft understandably receive the most attention from safety-conscious pilots and accident investigators. However, ground collisions between aircraft and between aircraft and other vehicles can and have resulted in serious injuries and significant aircraft damage. A review of the National Transportation Safety Board (NTSB) data for 1984 shows that there were a total of 33 aircraft accidents involving ground collisions.

While 33 accidents with only one fatality may seem an insignificantly small portion of total accidents, consider these figures: About 24 percent of these accidents involved collisions between two moving aircraft. In most of these cases, the pilots were aware of each other's presence. Approximately the same percentage of accidents involved collisions between moving aircraft and moving ground vehicles, again, where the pilot was aware of the location of the vehicle in most of the cases. Thus, in nearly half of the total 33 accidents, aircraft—containing passengers—were taxiing on ramps with the usual mixture of traffic to be found there; however, ordinary circumstances led to extraordinary accidents.

Only about six percent of the total ground collisions involved aircraft striking an obstruction other than another aircraft or a vehicle, but over one third occurred when an aircraft—usually one being improperly hand-propped—taxied into another, stationary aircraft.

A typical example involved a Cessna 150 that had stopped on a taxiway at an uncontrolled airport so that an instructor could deplane for his student to conduct a supervised solo. As the instructor was exiting the aircraft, the Cessna was struck from the left rear by a taxiing North American T-6 Trainer. Neither pilot saw the other before the collision. Fortunately, no one was seriously injured, but the stationary Cessna was substantially damaged. The Safety Board determined that the visual lookout of the T-6 pilot was inadequate.

After examination of the accident data and this example in particular, a reasonable individual might wonder, "Who's minding the store?"

Since many of the ground collisions took place while the aircraft and vehicles were under Air Traffic Control (ATC), it is obvious that, as with airborne collisions, contact with ATC does not automatically guarantee that you will not suffer unexpected and unwanted contact with a solid object.

What precautions can pilots take to prevent these "non-scheduled events?"

First and foremost, just as in the air, use your eyes, and look for other traffic. *There is no substitute for an alert, vigilant pilot.* Most of the accidents in this particular sample were attributed to pilot inattention and simple misjudgement of clearance distances. At least one case involved a collision where the taxiing pilot had a limitation on his medical certificate to wear glasses while exercising the privileges of his airman certificate. For some reason he was not wearing his glasses, and his airplane hit a parked truck whose position the pilot was aware of. The Safety Board found that a factor relating to the accident was the pilot's failure to wear the necessary corrective lenses.

Second, know your wing-tip clearance. A significant number of these ground accidents were caused by pilots' not maintaining adequate wing clearance. The pilots in these cases thought they could make it around the offending obstruction—they did not. Very few human injuries resulted, but insurance companies do not appreciate—and you will not either when your rates go up—this sort of highly preventable accident.

Third, use your ears, too. The NTSB attributed several accidents to pilots who had not followed both *verbal and written instructions* from ATC. At a recent airshow, a "Warbird" pilot who disregarded a controller's instructions taxied into another "Warbird's" rudder, causing substantial damage to both aircraft. Strict adherence to taxi instruction is just as important as following an airborne clearance to the letter; both help prevent collisions.

Fourth, pilots should also read and heed NOTAM's. Aircraft/vehicle collisions have occurred on airports during snow removal operations and airport construction. These events are NOTAMed when they affect aircraft operations on an airport. NOTAM's alert pilots to conditions requiring extra vigilance. (See the January/February 1986 issue of *FAA General Aviation News* for an article on the types of NOTAM's and their dissemination.) A prudent pilot should recognize that NOTAMed conditions, such as snow removal operations and airport construction projects, could mean that untrained personnel are operating equipment and construction vehicles on pavement areas used by aircraft. Looking out for ground personnel increases the responsibility of the pilot, but the definition of pilot-in-command (responsible for the operation and safety of an aircraft) includes looking out for anything or anyone posing a potential hazard. In short, be informed, alert, and aware of any person or thing on an airport.

One important precaution a pilot can take before taxiing or arriving at an unfamiliar airport, is to learn the airport layout from approach plates, taxi charts, and airport surface layout plans. The layout plans may often be available at the airport operations office, or you can find pictorial descriptions in some commercial publications. If you have none of these, you can always ask ground control at tower controlled airports for "progressive taxiing" instructions or request line assistance over UNICOM at uncontrolled airports. If no such assistance is available in the latter case, proceed slowly and cautiously. In either instance do not hesitate to call on your passengers to use their eyes as well, remembering, of course, that you are the final authority and yours is the ultimate responsibility. A good operating practice is to monitor the assigned ATC frequency after clearance onto an active runway for departure and until flight from the airport traffic area is completed, or after receipt of a landing clearance until after landing and crossing all active runways.

It is in your best interest to familiarize yourself with the FAA standard airport pavement marking and lighting systems. (The March/April 1981 issue of *FAA General Aviation News* contained a comprehensive article on airport markings.) Particularly, learn to recognize taxiway/runway hold line and taxi line markings: More than one ground collision accident has been the result of an inadvertent entry onto a runway by a pilot who was unsure of what the taxiway hold line markings meant.

Since some of these airport accidents can be attributed to the operators of ground equipment, what are airports themselves doing about preventing vehicles under their responsibility from colliding with moving or stationary aircraft? One way, of course, is through vehicle operator training. Even though the FAA has no data, most large and many smaller airports have a comprehensive initial and recurrent training program for airport ground equipment operators. Many airports also require that a properly trained airport employee monitor the airside ground movements of any equipment operator who has not had training in airport operations.

As an aid to try and prevent any unauthorized aircraft and vehicle runway incursions at John F. Kennedy International Airport, the Port Authority of New York and New Jersey and the FAA will soon be evaluating a test system of "traffic lights" for taxiing aircraft and ground vehicles. The system, controlled from the tower, will consist of a series of green and red in-pavement and edge lights located at the runway hold lines.
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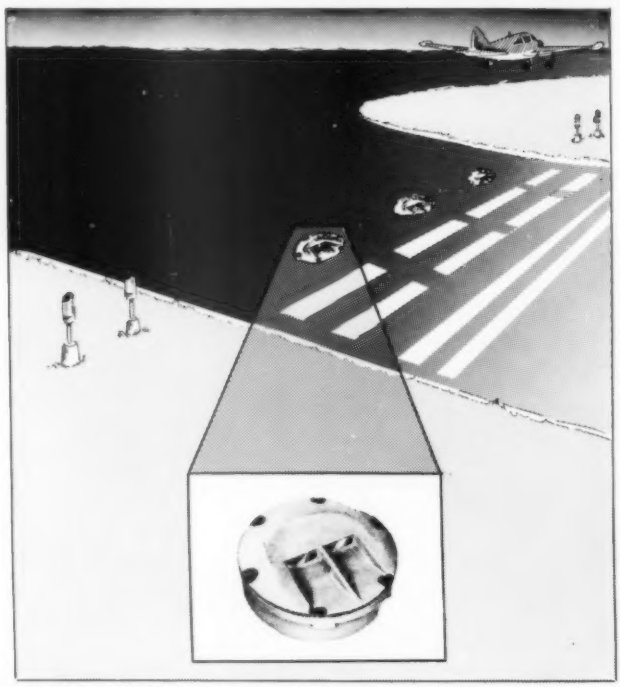


Artist's rendition of hold line lights to be installed at JFK.

FAMOUS FLIGHTS
STAR TREK

This issue's Famous Flight is somewhat of a departure from our usual fare. It is not about an actual flight but rather a flight of the imagination which became very real to a generation of television watchers. In fact, this article celebrates the 20th anniversary of that flight. In the May/June issue we delved 100 million years into the past with "QN—The Time Traveler." This issue we go forward in time to the 23rd Century to . . .

". . . Space, the final frontier. These are the voyages of the Starship Enterprise, *her five-year mission to explore strange, new worlds, to seek out new life and new civilization, to boldly go where no man has gone before."*—Ed.

On September 8, 1966 at the beginning of a new television season premiered the brainchild of a rather modest-appearing writer-producer. In the early 1960's he had become well-known in Hollywood for a number of conventional television series, *West Point, Have Gun, Will Travel,* and *The Lieutenants,* to name a few. However, his new show was entirely different, for it was not his version of a studio or network idea; it had been his dream for nearly 20 years. The man was Gene Roddenberry, and his television show, billed as the first serious science fiction on TV, was *Star Trek.*

The seeds of *Star Trek* were planted in Roddenberry in the late 1940's when he was a pilot for Pan American World Airways. On the New York to Calcutta run, he would look down on the earth from the cockpit of his DC-4 or "Connie" and think about flying among the stars. The camaraderie that evolved among the Pan Am flightcrew on the long (8,000 mi.) trip made him wonder about what a "space airliner" would be like. Roddenberry began putting these thoughts down in the form of science fiction short stories which he sold to a number of aviation magazines.

Dissatisfied with the life of an airline pilot, Roddenberry left Pan Am in 1949 to become a Los Angeles City policeman—specifically L.A. so he would be close to Hollywood and able to sell his growing stack of scripts. He continued to write for magazines and television and served as a consultant for cop shows. In the late 1950's he left the police department to work full time as a scriptwriter and eventually producer. In 1964 his studio, Paramount, asked him to come up with a new series concept to replace *The Lieutenants,* which was about to be cancelled.

Roddenberry's concept was the "Horatio Hornblower in space" or "Wagon Train to the stars" idea he had dreamed up while flying to Calcutta. The show would have a stalwart, resourceful captain, a loyal first officer, a crusty ship's surgeon, and a Scottish engineer, as well as several other supporting characters. The spaceship would be a vessel of peace equipped to wage war when necessary. The ship and crew were emissaries from an Earth that had solved its social, economic, and ecologic problems. *Star Trek's* message would be one of peace, brotherhood, and hope for the future.

The idea was sound although studio executive worried it would be too highbrow for the average television viewer, who was typically more interested in action than philosophy. Indeed, it took two pilots before a network (NBC) would buy the show, provided Roddenberry got rid of "the guy with the ears."

This referred, of course, to Spock, a half-alien, half-human science officer, played by stage actor Leonard Nimoy, who was the Captain's "second." He turned out to be popular with the viewers, and the network recanted. The Captain was James T. Kirk (Canadian actor William Shatner), brave, handsome, resourceful, or, as Roddenberry said, "The kind of airline captain I wish I had been." Dr. Leonard "Bones" McCoy was the Captain's confidante, a highly proficient medical doctor with a healthy mistrust of anything too scientific. He was portrayed by character actor Deforest Kelley. The fourth of the main characters was Scotty, the Chief Engineer who referred to his engines as his children and whose brogue was thick as shoe leather. James Doohan, actually a Scot and a master of accents, played Scotty.

The crew (l. to r.): Sulu, McCoy, Uhura, Chekov, Kirk (seated), Scotty, Saavik (from the second movie), and Spock.

The Five-Year Mission 20 Years Later

The ship: Battle-scarred *Enterprise* before her demise in *Star Trek III.*

The remainder of the secondary characters were comprised of a black woman (Uhura, acted by Nichelle Nichols, who went on to recruit for NASA) with an important position in the line of command, an oriental helmsman (Sulu, acted by George Takei, who briefly went into California politics), and a Russian navigator (Chekov, acted by Walter Koenig, who now does stage plays). Last but not least was the comely ship's nurse (Christine Chapel, played by Roddenberry's wife, Majel Barret; she also recorded the voice of the ship's computer), desperately in unrequited love with the logical, unemotional Spock.

In a time of racial and political strife people could—and did—tune to this program and be assured we were going to survive nuclear and ecological disaster and achieve a world where everyone was truly treated equally. *Star Trek* was a good dose of much-needed optimism at a time when people were pessimistic about the survival of the human race.

Even today nearly two decades after it left the air, that message continues to be heard. *Star Trek* the television series was cancelled in 1969, but the concept, the hope it represented lives on. There have been three successful motion picture films aired and dozens of novels written. Fans, old and new (some born *after* the program was cancelled), flock to conventions to see episodes they have already seen countless times and to hear the series' stars speak. The program is one of the most widely syndicated in the world. *Star Trek* is a phenomenon that will outlast the generation of baby boomers who first made it popular.

Representative of the optimism of *Star Trek* were the hope and aspirations of the Space Shuttle Transportation System. In 1978 when the prototype shuttle for the approach and landing tests was rolled out of the assembly plant, it was christened *Enterprise* by the *Star Trek* "crew." (*Enterprise* is currently "space-docked" at Dulles International Airport near Washington, D.C. awaiting construction of an Air and Space Museum annex. The "original" *Enterprise*, the model used in filming, is already housed in the Smithsonian's Air and Space Museum.)

We can apply *Star Trek's* message of hope to the plight of general aviation today: we should not let high costs of fuel and instruction, dwindling production and sales of general aviation aircraft get us down. There will be a day when pilots will find themselves flying routinely to orbit to jobs and homes and, eventually, between planets instead of cities. In the future there will always be a need for all kinds of pilots and aircraft, and we will get there.

Star Trek was and is that sort of inspiration, an ideal future to aspire for. Many of today's pilots (this writer included) took to the skies to make that possible future a reality. (Both William Shatner and Leonard Nimoy are pilots, as was Roddenberry.) The future that *Star Trek* represents is something we can all aim for. Its characters, its concepts are as much aviation and space pioneers as Lindbergh or Yeager or Glenn.

In the most recent movie, *Star Trek III: The Search for Spock*. The *Enterprise*, the symbol of future hope, was destroyed, but there was a promise of rebirth for the *Enterprise*. The hope never dies. That is a lesson all of us, in view of the *Challenger* disaster, need to remember. The *Enterprise* will live again in our dreams and imagination; aviation will continue to foster that imagination; and our space program will recover to take us to that final frontier.

So, Happy Anniversary, *Star Trek*, and thanks for inspiring us to the skies and beyond.

Beam us up, Scotty! ■

THE WHY OF WEATHER ACCIDENTS

. . .after all is said and written it may simply be ignorance . . .

If there is one conclusion that can be drawn from this business of aviation safety it is that the basic causes of aircraft accidents are seldom unique or different. For example this past year and so far in 1986, numerous pilots have again fallen victim to the same old, so-called "weather accident." In spite of the reams of paper that have been consumed on this subject and the thousands of spoken words delivered at innumerable safety meetings across the country, the grim reaper continues to take his toll in "bad" weather.

Why do pilots continue to become involved in weather situations beyond their capabilities? Is it because of *ignorance? Overconfidence?* Or because they *think* they must be somewhere at a given time? It has become an accepted fact among accident investigators that some pilots will fly into almost any kind of weather for relatively unimportant reasons. If you have been flying for any length of time at all, you probably have done the same at one time or another. The difference is that nothing has happened to you—short of a few more grey hairs and a prominent pucker mark in the left seat. Nothing has happened to you—*yet.*

We have all heard the various preventive measures necessary to avoid a weather accident: check the weather, make conservative decisions, use all available sources of information, etc. Not to be derogatory, but we did mention *ignorance* as a possible factor in weather accidents. It is becoming ever more apparent that there are pilots who do not fully understand the hazards of attempting to fly VFR in conditions where visibility is reduced by rain, sleet, drizzle, fog, etc. The ignorant act of flying VFR on top, *at night*, has figured in more than one weather accident. It is also evident from studying the reports of several fatal weather accidents that a majority of the pilots involved mistakenly believed that prevailing weather conditions, although marginal, were sufficient to conduct a safe VFR flight. (Really, folks, they do not call it *marginal* VFR for nothing.) This belief was generally supported by official weather reporting documents.

What is also clear is that the word "forecast" is not fully understood. There is a huge difference between a report (what is actually happening) and a forecast (what might happen sometime). Weather forecasting is not, nor has it ever been, an exact science. A pilot who puts total faith in a weather forecast without using any reports or his or her own two eyes is really no better than the pilot with no faith at all. In either case it can mean encountering adverse weather en route that (famous last words) "wasn't supposed to be there."

We can diminish our weather ignorance somewhat. Plenty of good books have been written on aviation weather. Attend an Accident Prevention Program Seminar that features any of several excellent programs about weather. Commercial aviation organizations often conduct weekend seminars on the subject. Stupidity can be excused because it is an inability to know; ignorance is inexcusable because it involves *not wanting to know.*

Summing up what has been said, we can look at the following weather accident cause factors taken from an FAA study. Pilots involved in weather accidents:

1. were *ignorant* of the vagaries of weather
2. used poor judgement because of that ignorance
3. were deficient in flight training
4. were not aware of or disregarded their personal limitations
5. were negligent in maintaining flight proficiency
6. were unfamiliar with their aircraft's capability
7. were unaware of or disregarded FAR's

The conclusion is left up to you. ■

(This article courtesy of Al Milana, Accident Prevention Program Specialist in the Lincoln, NB FSDO.)

FINDING THE RIGHT WORDS

Proper phraseology is the key to communication between pilot and controller

The commercial certificate applicant was on a VFR crosscountry flight and climbing through a Terminal Radar Service Area. She radioed approach control for Stage Three service, giving her aircraft type (Piper), N-number (N8529L), intentions, altitude, and heading. The approach controller gave the pilot a squawk and asked what kind of Piper.

"Approach, N8529 Lima is a Piper Warrior *II, over."*

"8529 Lima, I'll call you Cherokee *29 Lima, over."*

"Roger, 29 Lima."

The same controller was also working a corporate Cessna Citation *whose N-number was N3729 Lima. Approach control was calling this aircraft "*Citation *29 Lima."*

Ten o'clock in the morning, when the Cherokee *was transitting the TRSA, was a fairly busy time for the major hub airport located there. The transmissions were frequent and numerous, but the* Cherokee *pilot was quite accustomed to busy terminal areas. She was almost clear of the TRSA when the controller radioed, "*Cherokee *29 Lima, you are cleared to the Linden VOR and hold on the 090° radial. Break. United 256 climb to and maintain FL 180. . ." and so on.*

The Cherokee *pilot immediately radioed back, questioning the clearance. Since she was VFR, the holding clearance did not seem appropriate. The controller acknowledged that the transmission had been for* Citation *29 Lima instead. Now clear of the TRSA, the* Cherokee *pilot asked for termination of radar services to prevent further confusion. The* Citation *received the proper clearance, and everyone's flight ended smoothly.*

In childhood some of the simplest party games were the most fun and, sometimes, the most embarrassing. One such game is Gossip or Telephone, where a whispered phrase is repeated from one person to the next until the last person recites it aloud. Most of the time the end results bear little resemblance to the original statement—making everyone wonder why the simple task of repeating a statement accurately is so difficult.

Pilot/controller misunderstandings can be likened to this game. Thousands of anonymous reports to NASA's Aviation Safety Reporting System are filed each year concerning conditions experienced or observed in flight which cited pilot/controller misunderstandings as responsible for potentially hazardous situations. How is this possible? Equipment failure? Pressure from heavy traffic flow? Interference? Linguistic problems?

All of the above, to some extent, but none predominantly. Most air traffic control facility managers will tell you that mistakes—on the rare occasion when they do happen—are more likely to result when either the pilot or controller *expects* or *anticipates* information. Typically the error occurs in a fairly relaxed situation and involves a very routine exchange of information. What happens is that the pilot, or the controller, or sometimes both, thinks he hears what he expects to hear and proceeds accordingly.

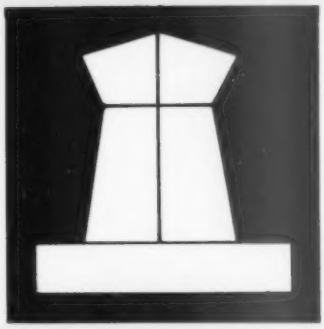
One way for the pilot to overcome this problem is to readback any clearance received to the controller. Although not foolproof, this practice helps to catch errors made by either party.

Another form of this "mis-anticipation" occurs when information a pilot is expecting does not arrive during the period expected, and the pilot changes course or altitude in a manner he assumes will be approved. Pilots should realize that as workload and weather conditions vary, controller techniques may also vary, but this is no reason for assuming the controller is neglecting your aircraft. A pilot should always be prepared to take action on his own when conditions concerning the safety of his aircraft require it, but second-guessing a controller—especially in IFR weather—is a dangerous game.

If you believe action on your own initiative is imperative, radio your intentions—the message may be heard even if it is not acknowledged. If

PILOT/CONTROLLER GLOSSARY

The following excerpts from the Pilot/Controller Glossary in the *Air Traffic Controller's Handbook* are frequently used phrases in radio communications.



ABORT—To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

ACKNOWLEDGE—Let me know that you have received and understand my message.

ADVISE INTENTIONS—Tell me what you plan to do.

AFFIRMATIVE—Yes.

AIRCRAFT CLASSES—For the purposes of wake turbulence separation minima, ATC classifies aircraft as Heavy, Large, and Small.

ALTITUDE RESTRICTIONS ARE CANCELLED—Adherence to previously imposed altitude restrictions is no longer required during a climb or descent.

APPROACH SPEED—The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration.

BROADCAST—Transmission of information for which an acknowledgement is not expected.

CALL UP—Initial voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call.

CARDINAL ALTITUDES OR FLIGHT LEVELS—"Odd" or "Even" thousand foot altitudes or flight levels; e.g., 5,000, 6,000, FL 250, FL 260.

CIRCLE TO RUNWAY (RUNWAY NUMBERED)—Used by ATC to inform the pilot that he must circle to land because the runway in use is other than the runway aligned with the instrument approach procedure. When the direction of the circling maneuver in relation to the airport/runway is required, the controller will state the direction and specify a left or right downwind or base leg as appropriate.

CIRCLING APPROACH—Maneuver initiated by pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable. This maneuver is made only after ATC authorization has been obtained and the pilot has established required visual reference to the airport.

CLEARED AS FILED—Means the aircraft is cleared to proceed in accordance with the route of flight filed in the flight plan. This clearance does not include the altitude, SID, or SID Transition.

CLEARED FOR (TYPE OF) APPROACH—ATC authorization for an aircraft to execute a specific instrument approach procedure to an airport; e.g., "Cleared for ILS Runway Three Six approach."

CLEARED FOR APPROACH—ATC authorization for an aircraft to execute any standard or special instrument approach procedure for that airport. Normally, an aircraft will be cleared for a specific instrument approach procedure.

CLEARED FOR TAKEOFF—ATC authorization for an aircraft to depart. It is predicated on known traffic and known physical airport conditions.

CLEARED FOR THE OPTION—ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop and go, or full stop landing at the discretion of the pilot. It is normally used in training so that an instructor can evaluate a student's performance under changing situations.

CLEARED THROUGH—ATC authorization for an aircraft to make intermediate stops at specified airports without refiling a flight plan while en route to the clearance limit.

CLEARED TO LAND—ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.

CORRECTION—An error has been made in the transmission and the correct version follows.

CROSS (FIX) AT (ALTITUDE)—Used by ATC when a specific altitude restriction at a specified fix is required.

CROSS (FIX) AT OR ABOVE (ALTITUDE)—Used by ATC when an altitude restriction at a specified fix is required. It does not prohibit the aircraft from crossing the fix at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment.

CROSS (FIX) AT OR BELOW (ALTITUDE)—Used by ATC when a maximum crossing altitude at a specific fix is required. It does not prohibit the aircraft from crossing the fix at a lower altitude; however, it must be at or above the minimum IFR altitude.

DIRECT—Straight line flight between two navigational aids, fixes, points, or any combination thereof. When used by pilots in describing off-airway routes, points defining direct route segments become compulsory reporting points unless the aircraft is under radar contact.

EXECUTE MISSED APPROACH—Instructions issued to a pilot making an instrument approach which means continue inbound to the missed approach point and execute the missed approach procedure as described on the Instrument Approach Procedure Chart or as previously assigned by ATC. The pilot may climb immediately to the altitude specified in the missed approach procedure upon making a missed approach. No turns should be initiated prior to reaching the missed approach point. When conducting an ASR or PAR approach, execute the assigned missed approach procedure immediately upon receiving instructions to "execute missed approach."

EXPECT (ALTITUDE) AT (TIME) OR (FIX)—Used under certain conditions in a departure clearance to provide a pilot with an altitude to be used in the event of two-way communication failure.

EXPECT DEPARTURE CLEARANCE (TIME) EDCT—Used in the Fuel Advisory Departure (FAD) program. The time the operator can expect a gate release. Excluding long distance flights, an EDCT will always be assigned even though it may be the same as the Estimated Time of Departure (ETD). The EDCT is calculated by adding the ground delay factor.

EXPECT FURTHER CLEARANCE (TIME)/EFC—The time a pilot can expect to receive clearance beyond a clearance limit.

EXPECT FURTHER CLEARANCE VIA (AIRWAYS, ROUTES OR FIXES)—Used to inform a pilot of the routing he can expect if any part of the route beyond a short range clearance differs from that filed.

EXPEDITE—Used by ATC when prompt compliance is required to avoid the development of an imminent situation.

FINAL—Commonly used to mean that an aircraft is on the final approach course or is aligned with a landing area.

FLIGHT LEVEL—A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level 250 represents a barometric altimeter indication of 25,000 feet; flight level 255, an indication of 25,500 feet.

FLY HEADING (DEGREES)—Informs the pilot of the heading he should fly. The pilot may have to turn to, or continue on, a specific compass direction in order to comply with the instructions. The pilot is expected to turn in the shorter direction to the heading unless otherwise instructed by ATC.

GO AHEAD—Proceed with your message. Not to be used for any other purpose.

GO AROUND—Instructions for a pilot to abandon his or her approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC.

HAVE NUMBERS—Used by pilots to inform ATC that they have received runway, wind, and altimeter information only.

HOW DO YOU HEAR ME?—A question relating to the quality of transmission or to determine how well the transmission is being received.

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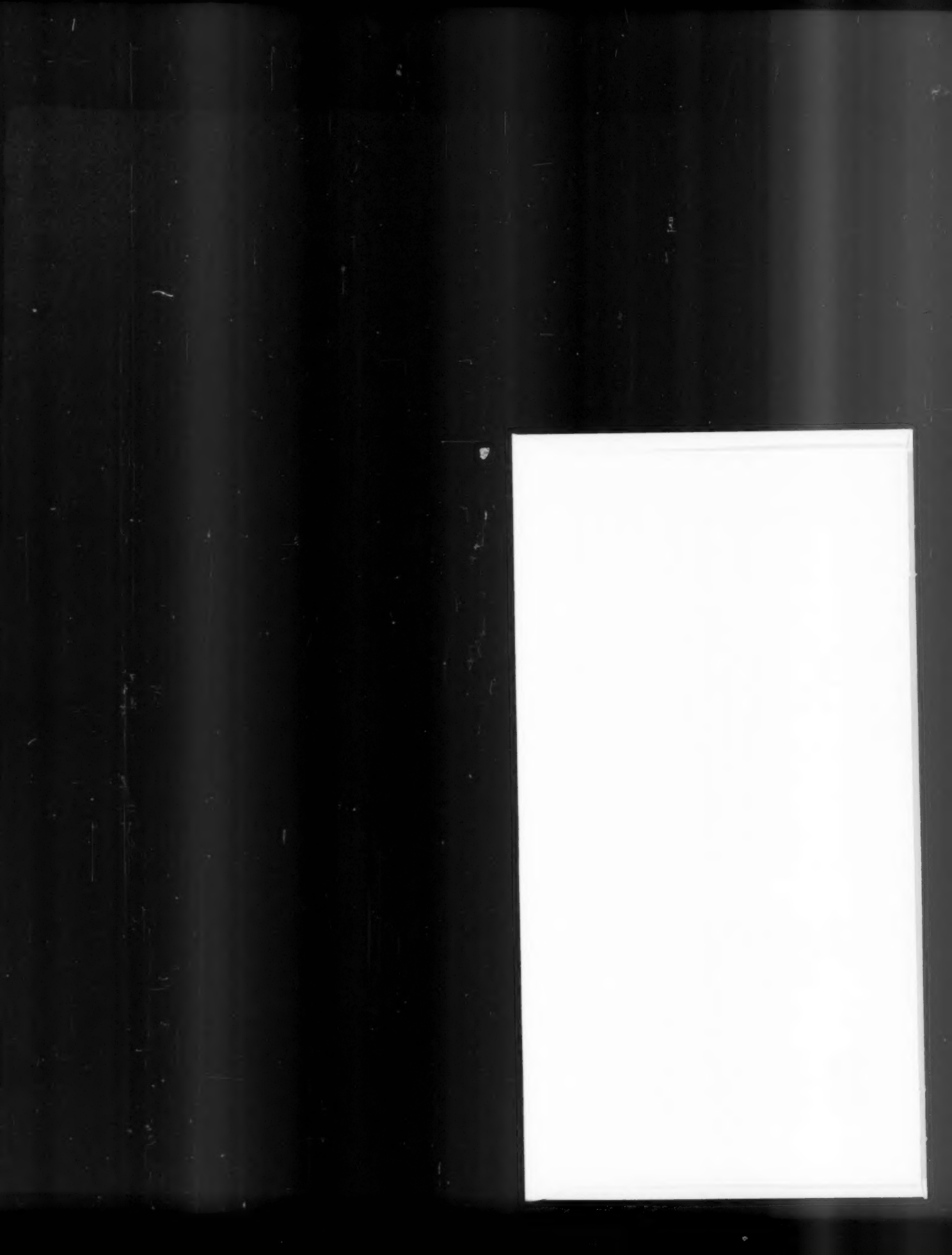

IDENT—A request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft.

IMMEDIATELY—Used by ATC when such action compliance is required to avoid an imminent situation.

INCREASE SPEED TO (SPEED)—Used by ATC to request pilots to adjust aircraft speed to a specific value for the purpose of providing desired spacing. Pilots are expected to maintain a speed of plus or minus 10 knots or 0.02 mach number of the specified speed.

I SAY AGAIN—The message will be repeated.

LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY—A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgement, places the aircraft in unsafe proximity to terrain or obstructions. The controller may discontinue the issuance of further alerts if the pilot advises he is taking action to correct the situation or has the other aircraft in sight.

MAINTAIN—1) Concerning altitude/flight level, the term means to remain at the altitude/flight level specified. The phrase "climb and" or "descend and" normally precedes "maintain" and the altitude assignment; e.g., "descend and maintain 5,000." 2) Concerning other ATC instructions, the term is used in its literal sense; e.g., maintain VFR.

MAKE SHORT APPROACH—Used by ATC to inform a pilot to alter his traffic pattern so as to make a short final approach.

MISSED APPROACH—1) A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. The route of flight and altitude are shown on instrument approach procedure charts. A pilot executing a missed approach prior to the Missed Approach Point (MAP) must continue along the final approach to the MAP. The pilot may climb immediately to the altitude specified in the missed approach procedure. 2) A term used by the pilot to inform ATC that he is executing the missed approach. 3) At locations where ATC radar service is provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

NEGATIVE—"No" or "permission not granted" or "that is not correct."

NEGATIVE CONTACT—Used by pilots to inform ATC that:

1) Previously issued traffic is not in sight. It may be followed by the pilot's request for the controller to provide assistance in avoiding the traffic.

2) They were unable to contact ATC on a particular frequency.

NUMEROUS TARGETS VICINITY (LOCATION)—A traffic advisory issued by ATC to advise pilots that the targets on the radar scope are too numerous to issue individually.

ON COURSE—1) Used to indicate that an aircraft is established on the route centerline. 2) Used by ATC to advise a pilot making a radar approach that the aircraft is lined up on the final approach course.

OUT—The conversation is ended and no response is expected.

OVER—My transmission is ended; I expect a response,

PILOT'S DISCRETION—When used in conjunction with altitude assignments, means that ATC has offered the pilot the option of starting climb or descent whenever he wishes and conducting the climb or descent at any rate he wishes. He may temporarily level off at any intermediate altitude. However, once he has vacated an altitude, he may not return to that altitude.

RADAR CONTACT—1) Used by ATC to inform an aircraft that it is identified on the radar display and radar flight following will be provided until radar identification is terminated. Radar service may also be provided within the limits of necessity and capability. When a pilot is informed of "radar contact," he automatically discontinues reporting over compulsory reporting points. 2) The term used to inform the controller that the aircraft is identified and approval is granted for the aircraft to enter the receiving controller's airspace.

RADAR SERVICE TERMINATED—Used by ATC to inform a pilot that he will no longer be provided any of the services that could be received while in radar contact. Radar service is automatically terminated, and the pilot is not advised in the following cases: 1) An aircraft cancels its IFR flight plan, except within a TCA, TRSA, ARSA, or where Stage II service is provided. 2) An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

3) An arriving VFR aircraft, receiving radar service to a tower-controlled airport within a TCA, TRSA, or where Stage II service is provided, has landed; or to all other airports, is instructed to change to tower or advisory frequency.

4) An aircraft completes a radar approach.

REPORT—Used to instruct pilots to advise ATC of specified information; e.g., "Report passing Hamilton VOR."

REQUEST FULL ROUTE CLEARANCE/FRC—Used by pilot to request that the entire route of flight be read verbatim in an ATC clearance. Such request should be made to prelude receiving an ATC clearance based on the original filed flight plan when a filed IFR flight plan has been revised by the pilot, company, or operations prior to departure.

RESUME OWN NAVIGATION—Used by ATC to advise a pilot to resume his own navigational responsibility. It is issued after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored.

ROGER—I have received all of your last transmission. It should not be used to answer a question requiring a yes or no answer.

RUNWAY HEADING—The magnetic direction indicated by the runway number. When cleared to "fly/maintain runway heading," pilots are expected to comply with the ATC clearance by flying the heading indicated by the runway number without applying any drift correction; e.g., Runway 4, 040° magnetic heading; Runway 20, 200° magnetic heading.

SAY AGAIN—Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received.

SAY ALTITUDE—Used by ATC to ascertain an aircraft's specific altitude/flight level. When the aircraft is climbing or descending, the pilot should state the indicated altitude rounded to the nearest 100 feet.

SAY HEADING—Used by ATC to request an aircraft heading. The pilot should state the actual heading of the aircraft.

SPEAK SLOWER—Used in verbal communications as a request to reduce speech rate.

SQUAWK (Mode, Code, Function)—Activate specific modes/codes/functions on the aircraft transponder; e.g., "Squawk three/alpha, two one zero five, low."

STAND BY—Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in "stand by for clearance." If a delay is lengthy the caller should reestablish contact.

STOP ALTITUDE SQUAWK—Used by ATC to inform an aircraft to turn-off the automatic altitude reporting feature of its transponder. It is issued when the verbally reported altitude varies 300 feet or more from the automatic altitude report.

STOP SQUAWK (Mode or Code)—Used by ATC to tell the pilot to turn specified functions of the aircraft transponder off.

TAXI INTO POSITION AND HOLD—Used by ATC to inform a pilot to taxi onto the departure runway in takeoff position and hold. It is not authorization for takeoff. It is used when takeoff clearance cannot immediately be issued because of traffic or other reasons.

THAT IS CORRECT—The understanding you have is right.

TRAFFIC IN SIGHT—Used by pilots to inform a controller that previously issued traffic is in sight.

TRAFFIC NO LONGER A FACTOR—Indicates that the traffic described in a previously issued traffic advisory is no longer a factor.

TRANSMITTING IN THE BLIND/BLIND TRANSMISSION—A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

UNABLE—Indicates inability to comply with a specific instruction, request, or clearance.

VERIFY—Request confirmation of information; e.g., "verify assigned altitude."

VERIFY SPECIFIC DIRECTION OF TAKEOFF (OR TURNS AFTER TAKEOFF)—Used by ATC to ascertain an aircraft's direction of takeoff and/or direction of turn after takeoff. It is normally used for IFR departures from an airport not having a control tower. When direct communication with the pilot is not possible, the request and information may be relayed through an FSS, dispatcher, or by other means.

WHEN ABLE—When used in conjunction with ATC instructions, gives the pilot the latitude to delay compliance until a condition or event has been reconciled. Unlike "pilot discretion," when instructions are prefaced "when able," the pilot is expected to seek the first opportunity to comply. Once a maneuver has been initiated, the pilot is expected to continue until the specifications of the instructions have been met. "When able" should not be used when expeditious compliance is required.

WILCO—I have received your message, understand it, and will comply with it.

WORDS TWICE—1) As a request: "Communication is difficult. Please say every phrase twice." 2) As information: "Since communications are difficult, every phrase in this message will be spoken twice."

the frequency is blocked, use another—even 121.5 if the situation appears to be of an emergency nature.

One occasional cause of air-to-ground misunderstanding can easily be avoided: the use of non-standard phraseology, either by pilot or controller. Non-standard phraseology means anything from casual language to "CB" talk or slang. Slang is colorful and sometimes amusing but may be misleading. ("Neat," for example, in modern parlance can mean virtually anything but "tidy.") There is no room for guesswork in air traffic control phraseology.

Controllers are trained to use specific words and phrases which may sound stilted at times but which pinpoint their meaning precisely, and experienced pilots usually adhere to the same kind of language. Try to interject professionalism in your transmissions without being too stiff or formal, even if you are just out for a pleasure flight in a small single engine airplane. If someone, in a relaxed mood, falls into a slangy mode, there is no need for his respondent to go along with it. One small ambiguity can lead to a very large collision. In the example in the beginning of the article, even though it would have taken more transmission time, perhaps full N-numbers should have been used, or at the least, the Piper could have been called "*Warrior* 29 Lima" to help differentiate between the aircraft and eliminate confusion.

Once in a while pilots will encounter controllers who use local names that are not on the charts, instead of the usual reference points: "Turn final over Little Creek," might be an example. Which creek is Little Creek? And suppose there is no creek in sight, only a dry creek bed or two? Local pilots know, of course, but visitors are likely to wind up "up the creek" if they guess. The appropriate pilot response to any imprecise advisory is a straight-out question: "What do you mean?" (If you respond with "Say again, please," the controller will merely repeat the instruction without an explanation.) The point is, never "roger" anything that you do not fully understand or that does not make sense. Instead, request clarification.

Inexperienced pilots, or those who have never before flown into busy controlled terminals, are sometimes intimidated by and unable to keep up with the pace of ATC communications. In most cases the controller will recognize the problem and enunciate more slowly. In any event the pilot should never guess or try to anticipate what he cannot clearly understand. The controller is there to provide a helpful service, not to test the pilot's ability or question his competence. If the pace gets too much for a pilot, he can always ask the controller to speak more slowly. The *Airman's Information Manual* recommends that a low-time or student pilot let ATC know of their status, and ATC will adjust delivery accordingly.

Flying with a second pilot who can handle the radio, write down clearances, inspect charts, and scan for landmarks (as well as traffic) while you fly the airplane is one solution to getting safely over the hump of inexperience in a busy environment. If that is not possible, acquire the most convenient knee pad or other means of writing down radioed data. Controlling the aircraft, handling the radio, and going over charts and checklists can keep both your hands and your eyes pretty busy, and few of us have mastered the fine art of writing with a pencil in our mouth while talking on the radio.

Pilots who fly in busy terminal areas and often receive a great deal of information in a single transmission find out soon enough that memory alone is not sufficient when a string of numbers is involved. For example, IFR clearances should always be written down and at least the headings and altitude numbers readback. Similarly, taxiing instructions which involve several taxiways should also be written, and, as a minimum, any "hold short" instructions should be readback.

When messages are relayed very rapidly, there is a chance that numbers may be misspoken or misheard, especially when given in conjunction with similar sounding vowels. If you have any doubts, repeat the message, pausing briefly before enunciating each of the numbers. For example, a busy sector controller in a midwest air route traffic control center radioed a corporate jet climbing out at 1,800 feet to "climb to two two thousand." Hearing that sentence is much different from reading it: Did the controller mean climb to 2,000 feet or 22,000? The 34-year-old professional pilot queried for clarification after consultation with his copilot. The controller responded, "Roger, climb to two two thousand." The pilot persisted, asking if the controller meant altitude two thousand feet or flight level two two zero (22,000 feet). The controller then confirmed, "Climb to and maintain flight level two two zero."

The controller may sound busy and you may be a little uptight yourself, but neither of you can afford to make a mistake or rely on guesswork. The system works only when everyone is exactly where he is supposed to be and communication is complete.

It is a game for serious adults. ■

(A full discussion of radio terminology is found in the Airman's Information Manual—Basic Flight Information and ATC Procedures, issued quarterly by the Superintendent of Documents, GPO, Washington, DC 20402. Contact GPO for the current price. Data concerning pilot and controller reports on unsafe conditions was derived from NASA's Aviation Safety Reporting System, a program where anyone can anonymously report to NASA incidents they witnessed or experienced that posed a threat to safe operations.)

TIPS FOR EFFECTIVE RADIO COMMUNICATIONS

• Listen before you transmit. Many times you can get the information you want from ATIS or by monitoring the frequency. Except for a few situations where some frequency overlap occurs, if you hear someone else talking, the keying of your transmitter will be futile and you will probably jam their receivers causing them to repeat their call. If you have just changed frequencies, pause, listen, make sure the frequency is clear.

• Think before keying your transmitter. Know what you want to say and if it is lengthy, for example, a flight plan or IFR position report, jot it down.

• Speak clearly, slowly, and audibly in a normal conversational tone to reduce the possibility of being misunderstood. The microphone should be very close to your lips and after pressing the mike button, a slight pause may be necessary to be sure the first word is transmitted. Some pilots find headsets handy because of the noise level in today's general aviation aircraft.

• Use the following format when making initial contact:

1) name of facility being called
2) your full aircraft identification
3) type of message to follow or your request if it is short
4) include your position or altitude, the phrase "Have numbers" or "Information Charlie received" (for ATIS) helps decrease radio frequency congestion. Use discretion and do not overload the controller with information he does not need.

• Wait a few seconds before calling again after you have released the button. The controller or FSS specialist may be jotting down your number, looking for your flight plan, transmitting on a different frequency, or selecting his transmitter to your frequency.

• Always use your aircraft identification in all transmissions.

• Acknowledge clearances, vectors, holding instructions, etc., with full readbacks and aircraft identification. This not only double checks for the pilot but also the controller the accuracy of the clearance and who received it.

• Check your volume, recheck your frequency and make sure that your microphone is not stuck in the transmit position. If the assigned frequency is completely blocked by this type of interference, use the procedures described for en route IFR radio frequency outage, to establish or reestablish communications with ATC.

• Be sure you are within the performance range of your radio equipment and ground station equipment. Remote radio sites do not always transmit and receive on all of a facility's available frequencies. Remember that higher altitude increases the range of VHF "line of sight" communications.

• Be considerate. Do not talk about personal business or gossip on ATC frequencies or the UNICOM. Others are waiting to talk to the same person so they can continue their flight. After landing you can telephone and get the information you want.

• Above all else, be professional in your transmissions whether you are the controller or the pilot.

OPERATION LIGHTS ON

Volunteer to be more visible

In recent years collision avoidance, both for aircraft in the air and on the ground, has become a priority item on the list of aviation safety concerns and rightfully so. When midair accidents occur they are usually very serious and often involve fatalities. Ground accidents are generally less serious but often involve substantial damage. (See the article on p. 3 for a discussion of ground collisions.)

Midair collisions occur on an average of two per month, and ground collisions between aircraft and between aircraft and ground vehicles average almost three per month.

Pilots can reduce the possibility of becoming involved in such accidents, in the air and on the ground, by:

- maintaining a constant scan for traffic
- avoiding complacency
- making position reports
- broadcasting your position and intentions at uncontrolled airports

(Note: To prevent ground accidents, emphasize the first two points above in your daily operations. The latter two suggestions might unnecessarily tie up radio frequencies on the ground and should be used with discretion.)

Another safety measure a pilot can take is to participate in FAA's "Operation Lights On." This is a purely voluntary program in which all pilots are encouraged to turn on their anti-collision or other appropriate exterior lights when below 10,000 feet MSL and whenever (day or night) the aircraft engines are running. Also, turn on the landing lights when:

1. taxiing on to an active runway, day or night
2. operating within 10 miles of any airport, day or night
3. operating in conditions of reduced visibility; i.e., haze, dusk, etc.
4. operating where flocks of birds may be expected; i.e., in coastal areas, near lakes, swamps, dumps, or bird sanctuaries
5. operating under a Special VFR clearance

The purpose of all this is to make the aircraft as visible as possible. In reduced visibility conditions, some aircraft blend very well into surrounding haze or clouds or terrain. Pilots need all the help they can get in seeing and avoiding other aircraft on the ground and in the air, and "Operation Lights On" is a big help.

However, a few words of caution should be observed in relation to this practice.

- Do not become complacent about keeping a sharp lookout for other aircraft. Not all aircraft are equipped with lights and some pilots may not turn their lights on for various reasons. Continue to scan for other aircraft/vehicles even after a taxi or flight clearance has been received.
- Consult the aircraft manufacturer's recommendations on the operating limitations for the lights (especially the landing light) and the electrical load placed on the electrical system when all the lights are on. It is nice to enhance your visibility but not at the risk of an electrical failure in flight at the worst possible moment.
- Do not forget to turn the lights off before leaving your aircraft. No drain on the battery will occur with the master off, but the next time you go out to the aircraft and turn the switches on, the resulting electrical load could disable your electrical system.
- The *Airman's Information Manual* should be consulted for tips on operation of aircraft lights on the ground.

FAA is encouraging "Operation Lights On" as a further collision avoidance aid. Flight instructors are urged to participate during training flights and to get their students in the habit—but not at the expense of using the best collision avoidance device, the pilot's eyes.

Accidents can be prevented by paying special attention to safety. Your voluntary participation in "Operation Lights On" will help. ■

(This article was prepared with the assistance of Ellen M. Bowie of FAA's Accident Prevention Program Branch.)

How to Buy a SAFE, Used Airplane

Buying an airplane is a relatively easy thing to do especially when you compare it to convincing your spouse that you have to sell the car so you can make the down payment on your dream.

But dreams can turn into nightmares for those individuals who buy with their hearts instead of their heads. To avoid a possibly hazardous situation, prevent a financial black eye, and fulfill your dreams, three steps should be taken in order to buy an airplane, which is, first of all, safe to fly.

STEP 1—RESEARCH: This is where the buyer justifies the "need" to own an airplane, matching one's pilot abilities to the aircraft's performance, and then matching one's cash flow to a particular make and model airplane.

Once the "need" is satisfied and a particular make and model has been selected, the buyer must find out as much information as possible about the airplane. Sometimes useful information is found in aviation trade publications (e.g., pilot test flights or evaluations), aircraft flight manuals, comments from owners of similar makes and models, and demonstration rides.

Other valuable pieces of information that are often overlooked by prospective buyers are the Type Certificate Data or Specification Sheets and Airworthiness Directives issued against the aircraft by the Federal Aviation Administration.

Type Certificate Data or Specification Sheets can be best described as "birth certificates" for aircraft, engines, and propellers. They describe the aircraft, engine, and propeller, list serial numbers, emergency equipment, limitations, and other important data.

Airworthiness Directives (AD's) are mandatory inspections, repairs, or replacement of parts against a particular aircraft or product. Some AD's are recurrent, others are one-time compliances. The two things notable about AD's are that they will cause airplane maintenance downtime and cost money. So the number of AD's against the airplane plus their impact on your pocketbook must be examined.

Type Certificate Data or Specification Sheets and AD's for the make and model you are interested in can usually be found at appropriately-rated FAA repair stations or aircraft dealer service centers doing business at local airports. At the same time it would be a good idea to pick up a manufacturer's inspection form, which contains a list of all items required for the 100-hour and annual inspections. These folks might charge a small fee for copies of the data, but the information received is worth many times the cost.

During this step is also the time to determine the operating cost of the aircraft per hour per year. Add up all the known expenses such as annual inspections, regular maintenance, tie-down, insurance, fuel, oil, engine, and propeller overhaul, and divide by the number of estimated hours per year the airplane will be operated. The fewer hours you operate the more expensive it is to own the airplane. If your expected usage will be limited, you might find it cheaper to rent or lease an airplane rather than own one.

Once you have assembled this mountain of information you must separate it into two columns—Pro and Con. Your head must not allow your heart to have any say here. The final count will determine if you proceed to Step #2.

STEP 2—INSPECTION: Now that the Pro's have won; inspection of the aircraft is next.

This part of buying an airplane usually consists of two or more inspections. The prospective buyer may perform several inspections on an airplane, but the last inspection should be done by a certificated mechanic familiar with the make and model airplane you intend to buy.

Obviously, to inspect an airplane you want to buy you must find one that is for sale. This is usually accomplished by scanning the "Aircraft for Sale" column of the local papers within a 50-mile radius of home (for your convenience) then checking any of several commercial publications to determine an average asking price. You should make appointments with

the owners of at least three airplanes of the make and model you are interested in.

So, armed with the type certificate data or spec sheets, list of AD's manufacturer's inspection forms, flashlight, inspection mirror, clipboard, and pencil as well as a list of unanswered questions raised by your research, you arrive at the airport. Ideally, the airplane should be in a hangar with plenty of available light, but the first "Introductory" inspection can be done out on the ramp.

The purpose of this inspection is to make a preliminary determination if the airplane is "airworthy" or not. "Airworthy" is defined by the FAA as an airplane that meets all the requirements of its type certificate data or specification sheet and is in a condition for safe operation.

To make a determination that the airplane is airworthy you must start with what is basically a thorough preflight inspection. To begin, have the owner open all doors and the engine cowling, if possible, and have him show you the following documentation:

1. Airworthiness Certificate
2. Registration Certificate
3. Weight and Balance Form
4. Equipment List
5. Maintenance Records for the airframe, engine, and propellers.

Make sure that the make, model, serial number, and registration numbers are the same on all the certificate and maintenance records. Next make sure that the correct "N" number is on the airplane and the serial number on the airplane data plate is the same as the one on the certificates. Also check that the engine and propeller model and serial number on the data plates are the same as in the maintenance records.

All this number matching may seem a little bit childish, but it is very important! How else can you determine total time and maintenance history on the airplane unless the records reflect the actual equipment in the airplane. It is not uncommon to find an airplane with an illegitimate set of log books, instead of the originals.

Next, check the equipment list against the equipment in the airplane. If there are additional pieces of equipment in or on the airplane and the equipment list does not reflect them, you can be sure there is a good chance that the weight and balance is incorrect. If you find this is so, advise the owner that Federal Aviation Regulations require that the weight and balance and equipment lists be corrected by a certificated Airframe and Powerplant mechanic before the next flight.

The maintenance records are next. You should be able to trace the history of the airplane back to the day it was manufactured. During the records check is also a good time to see if the AD's against this particular airplane were compiled with. You should also copy down the date of the last annual inspection, total time of the airframe, engine, and propeller, and list the major repairs and alterations performed.

After the paperwork drill, you get the chance to use the "visual" in visual inspection. The manufacturer's checklist is your best guide for the inspection. Obviously you will not be able to do a gear swing or remove all the fairings on the aircraft at this time, but you should be able to mark off 35 to 50 percent of the items called out on the inspection form.

In addition to the manufacturer's inspection items, these following areas should be inspected:

1. The Artificial Horizon and Direction Gyro faces should be checked for milky white haze or fog on the glass. This is an indication that the instrument's glass seal has been breached and moisture has entered the instrument reducing the useful life of the gyros inside.

2. Move the fuel selectors through each position and check for ease of movement and detent, including the off position. A selector which is hard to move or makes a binding noise needs cleaning and lubrication.

3. Next, check for "Hangar Rash." Nicks, dents, and scrapes are the price an airplane pays for being wider than it is long. Most "Hangar Rash" occurs at the wing tips forward of the navigation lights. The majority of wing tips on general aviation aircraft are made out of fiberglas, and the tips can absorb a lot of punishment. However, if you notice the wing tip is damaged or even scraped you should carefully check the inboard rear spar area where the trailing edge of the wing attaches to the fuselage. If the wing skin in this area is buckled, creased, or in any way deformed, you can suspect that a great deal of damage has been done. How? The small impact or force at the wing tip has used the length of the wing as a lever to exert a tremendous force at the rear spar wing fitting. This could mean an unairworthy airplane and a very expensive repair.

4. Propellers are second only to landing gear in the amount of abuse pilots hand out. A propeller should be carefully inspected for cracks, nicks, corrosion, and alignment. The propeller tips will show signs that it struck the ground during a hard landing by grind marks visible on the ends of the propeller tips. If you find a propeller in this condition or see a log book entry that the propeller has been straightened, you should suspect a ground strike has occurred and that engine damage is possible.

5. During your inspection, you can determine if an airplane is within rigging tolerance by first setting the trim controls in neutral, flaps up, and removing all gust locks. Next, open the cabin door on the right side of the airplane so you can see the control yokes and then position yourself near the point on the right wing where the flap and aileron trailing edges almost meet. Now grab the aileron and flap and put the trailing edges side-by-side. This should be the neutral position. Next check the position of the control yokes in the cabin and the aileron and flap position on the opposite wing while keeping the right aileron and flap in the neutral position. The control yokes should be horizontal, and the flap and aileron on the opposite wing should be in the neutral position. If either of the control yokes or aileron is more than a ¼ inch away from neutral, the airplane is out of rig. The elevator/stabilizer and rudder are harder to check without the proper tools and rigging fixtures. However, you can determine if the cable tension is too loose by moving the elevator or rudder briskly, taking care not to hit the control stops and listening if the cables slap the cable guides. This slapping or whipping sound is a good indication the cable tension is too loose and the flight controls are out of rig.

If, after the visual inspection, you are satisfied that the airplane is airworthy, a test flight should be next. If you are not familiar with the aircraft make sure your check pilot is. The test flight or demonstration ride should determine if the airplane meets the flight manual/owner's manual performance specifications and that all equipment works properly. You might need to make several flights to satisfy yourself that the airplane performs to your and the manufacturer's standards.

The Final Step—Decision! After you have inspected at least three aircraft and narrowed your choice down to one, you need the help of an experienced mechanic and a title search company.

The mechanic should be chosen with care. He or she should be familiar with the make and model of the airplane you are interested in and have all the equipment and data necessary to inspect and research the gray areas you might have overlooked. The inspection should determine the mechanical condition of the airplane, its related parts, and the airworthiness condition of the aircraft. The annual-type inspection is the very best inspection to make this airworthiness determination.

At the same time a title search must be started. A title search is very important for it will certify that the title for the airplane is free and clear or if there is a lien against the airplane. For an additional charge you can obtain title insurance by which the title company guarantees your title against unrecorded liens, chattel mortgages, and other claims against the airplane. A list of title companies can be obtained from the nearest FAA Flight Standards District Office (FSDO).

While you are at the local district office you can also pick up an application for registration (AC Form 8050-1) and Bill of Sale Form (AC Form 8050-2), since federal regulations require new owners to register their aircraft with the Federal Aviation Administration Registry in Oklahoma City. The cost of registering the airplane is still only $5.00.

Now the only thing left to do is to make the decision to buy or pass this opportunity up. If your research has been thorough, both your and the mechanic's inspections satisfactory, the title is free and clear, and you convinced your spouse to sell the car, go buy your dream. ■

(This article was prepared with the assistance of Bill O'Brien, a specialist in the General Aviation and Commercial Branch of the Aircraft Maintenance Division.)

U.S. AEROBATIC CHAMPS. Just before departing for South Cerney, Gloucestershire, England for the 13th World Aerobatic Championships, the 1986 U.S. team (pilots, team doctors, judges, et. al.) posed for a group portrait with their aircraft. Front l. to r.: Bill Thomas, Bob Tiberg, Ray Williams, Dr. Eoin Harvey, Paul Erdman, Terry Caphart, Bill McIntyre, Bill Hunter, and Bob Davis. Standing l. to r.: Pete Anderson, Clint McHenry, Debby Rihn, Dr. Julie Pfile, Harold Chappell, Henry Haigh, Kermit Weeks, Linda Meyers, Patty Wagstaff, Gene Beggs, and Bob Carmichael.

SUCCESSFUL SAFETY SEMINARS

"Back-to-Basics" is packing them in. FAA's three year project to re-emphasize the fundamentals of flying is enjoying spectacular success and airman participation. Since the start of Back-to-Basics in January of this year, there have been 6,400 seminars nationwide, attended by 300,000 persons.

A recent example of this success occurred in Hartford, CT at Bradley International Airport. An Accident Prevention Program "Super Seminar" with the theme "Safety Through Education and Proficiency" (STEP) held on June 21 attracted nearly 3,000 pilots. Over 200 airplanes flew into Bradley Field to attend the event, but pilots and controllers responded with safe and professional operations.

Attendees were treated to an address given by FAA Administrator Donald D. Engen and presentations from other local and national FAA personnel. Connecticut's governor and a Congresswoman were also featured speakers. Notables from the aviation industry were also well-received. Perhaps the highlight of the program were the personal reminiscences of actress Pamela (*Buck Rogers, Matt Houston*) Hensley and actor Cliff (*The Pilot*) Robertson. Ms. Hensley is a recently certificated private pilot, and Mr. Robertson, a high-time pilot, has appeared at safety seminars all over the country. Although a difference of many hours of experience separate them, the two entertainers were in unison about the need for Back-to-Basics.

The Back-to-Basics topic for the final quarter of 1986 is Fueling Problems—or to put it in Back-to-Basics simplicity, "running out of gas." Continued high seminar attendance is expected for 1987, and the topics for the first two quarters of 1987 are "Decision Making" and "Medical Factors," respectively.

Contact your local accident prevention specialist for seminars in your area.

See you there!

GIVING CUSTOMS A HAND

In response to a request from the U.S. Customs Service, FAA has proposed three rule changes to aid Customs in stopping drug smuggling by aircraft.

One rule would require the display of registration marks (N-numbers) 12-inches high on aircraft flying in and out of the U.S. Larger marks make it easier to spot and identify aircraft from the ground.

The second proposal would require aircraft to have an externally-mounted identification plate readable by persons standing outside the aircraft while it is on the ground. The outside ID plate would allow law enforcement officials to check suspicious aircraft more easily.

The last proposal would require operators of aircraft modified with supplemental fuel tanks (under FAR Part 43) in the passenger or baggage compartment to have on-board documentation (FAA Form 337) that the tanks' installation was FAA-approved.

ATA PETITION COMMENTS SOUGHT

FAA is accepting comments on a petition for rulemaking from the Air Transport Association of America. ATA wants various sections of FAR Part 91 amended to require additional implementation of automatic altitude reporting equipment in aircraft currently not required to have it and improved equipment in aircraft now having automatic altitude reporting equipment.

The petition consists of five proposals:

1. carriage of an operating transponder with automatic altitude reporting capability in all terminal airspace where radar service is provided and in all controlled airspace above 4,000 feet AGL, effective July 1, 1989
2. effective July 1, 1992 require all new altitude reporting equipment installations to meet improved performance standards and to reply to Mode S interrogations with altitude information in 25-foot increments
3. effective July 1, 1997 require all operating transponders to meet the standards in proposal #2
4. revise FAR Part 43, Appendix E to incorporate the proposed standards and reduce the increments for inspections and maintenance
5. require biennial checks of automatic altitude reporting equipment in all aircraft so equipped, not just for IFR aircraft

Comments should be sent as soon as possible to FAA, Office of the Chief Counsel, AGC-204, Docket No. 24953, 800 Independence Ave., S.W., Washington, D.C. 20591.

LATEST AIRMAN PUBLICATIONS

New Written Test Books

Copies of the new written test question books, which may be used for study purposes by applicants for the various pilot, flight engineer, and mechanic certificates issued by FAA, are now on sale at the Government Printing Office. Titles, prices, and identification data are provided in FAA Advisory Circular 60-19, "Announcement of Availability: New Series Written Test Question Book." Free from DOT Subsequent Distribution Unit, M-494.3, Washington, D.C. 20590.

VOYAGER UPDATE

On July 15 *Voyager* landed in the Mohave desert after a four and a half day flight which broke several aviation records (longest flight without refueling and longest non-stop flight). The flight was a trial run for the proposed, non-stop, around the world trip scheduled for September 11, 1986.

Pilots Dick Rutan and Jeana Yeager stayed aloft for 11 hours and 11,600 miles without stopping or refueling. They travelled up and down the California Coast, averaging 90 mph and 29 miles to the gallon.

FlightFORUM

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-810, Washington, D.C. 20591.

• Clearing Turns

I am a commercial student, and my instructor and I need your help in clarifying something. We say that clearing turns must be done before executing chandelles and "Lazy 8's." Another instructor says they are clearing maneuvers in themselves, and no turns are necessary. Who is correct?

Also, in airplanes with controllable speed propellers, I know some pilots who climb to cruise altitude with the throttle and prop levers full forward, developing full power. Others reduce the manifold pressure and RPM to "25-square" during initial climb-out. Which is correct?

Name Withheld

For your first question, you and your instructor are correct. An applicant for any pilot certificate or rating must use proper and effective scanning techniques to "clear the area" for certain maneuvers, including chandelles and "Lazy 8's." The inclusion of clearing turns is part of FAA's new Practical Test Standards. Also, the *Flight Training Handbook*, AC 61-21A, advises that, for both chandelles and "Lazy 8's," "'. . . the airspace behind and above should be clear of other air traffic." Since both of these maneuvers involve, at some point, nose-high attitude and steep banks which can obscure the pilot's visual field, the clearing turns are necessary.

As for your second question, all we can say is check the pilot's operating handbook for the aircraft and follow the manufacturer's recommendations.

• Controller ID'ed

The article on the 50th anniversary was very interesting. I particularly liked the comments on Archie League. Is that he with the flag in the title picture?

Heather Schoenberg
Cheyenne, WY

Affirmative. That certainly is Archie in all his regalia.

• Changing of the Guard

I have noticed in the last several issues you have had the Accident Prevention Program on your masthead and that more accident prevention-type articles have been appearing on topics that match those for Back-to-Basics. I think it's great, but what does it mean?

Jenni Verge
Clinton, MD

It means that *FAA General Aviation News* is now a part of the Accident Prevention Program Branch. We are enjoying it, and we are glad you like it, too.

• Unauthorized Takeover

I'd like to pass on some advice learned the hard way to those of you who can't wait to get your tiny tots in the copilot's seat. My toddler (two years old) had been begging for an airplane ride. So I moved the passenger seat on my C-172 fully aft and strapped in the FAA-approved car seat. During takeoff, as the airplane neared flying speed, I eased back on the yoke. When my son saw the yoke on his side moving toward him, he lunged forward, grabbed the yoke with both hands, and pulled with all his not insubstantial might. I managed to keep out of a stall and finally pried his fingers off in cruise. However, he discovered even though I might smack his hands, he could still kick the yoke with his feet.

He also tried to fight me for the handheld mike while I was talking to approach control—they must have heard some pretty strange transmissions. Blessedly, after 20 minutes aloft he fell asleep, and I learned my lesson. A good backseat passenger, which he was, can't always be trusted within grabbing distance of the controls—especially when they're in the "terrible two's."

Name withheld

How right you are! Aviator parents naturally wish to introduce their offspring to flying as soon as possible. As you have indicated, they can be quite a distraction, so a little discretion is in order.

INSTRUMENT CORNER

• Competency Check and BFR's

I'm writing in reference to FAR § 61.57 (Recent Flight Experience). I'm an instrument rated commercial pilot, and I've been meeting the recent IFR experience requirement by getting a competency check every six months. My question is does this IFR check count as a biennial flight review? If so, how is it noted in my logbook? If not, what do I have to do in addition to the IFR competency check?

It appears to me that if there is any way to combine the review and the competency check, I'd be better off legally, professionally, and financially.

Sidney Fleishman
Panama City, FL

The instrument competency check will satisfy the requirements for a biennial flight review. A flight review is not necessary if, within the preceding 24 months, you have had a pilot proficiency check (by the FAA, by an approved check airman, or by a U.S. armed forces pilot) for a pilot certificate, rating, or operating privilege. The instructor conducting the review notes successful or unsuccessful completion by an appropriate notation in your logbook. However, the decision to count the competency check as a BFR also is up to the flight instructor.

• Logging Instrument Time

I recently went back through my back issues of FAA General Aviation News *to try to find an answer to a question I have regarding logging of instrument time. I was unable to find quite what I was looking for, so I am writing for a specific answer.*

The situation is this: Pilot A is instrument rated and current. Pilot B is not instrument rated (but wants to practice for the rating). Both pilots are current for the category and class of aircraft, with current medicals and BFR's. Both hold private pilot licenses (only, no CFI for Pilot A). According to the FAR's, when Pilot B is in VFR conditions with a hood and on an IFR flight plan, with Pilot A in the right seat as check pilot, Pilot B may log this time as PIC and Pilot A may (only) log this time as "check pilot" or "second in command." (Right?)

My question is this: In the same situation, but in ACTUAL IFR conditions, who logs what? Can Pilot B still log PIC even though not rated for IMC? Or is Pilot A now the "official" PIC? Does the situation change if Pilot A is a CFI? (I would guess so since all "dual" time after the private license is also PIC.)

I have been unable to find a clear answer to this in the FAA publications (FAR's, AIM, etc.) and from various CFI's. Since the word of this magazine is just as good, I would really appreciate knowing how this is supposed to be done and who can log what? Many thanks!

P.S. One further question: Does any of this type of flying count toward the required time for Pilot B's instrument rating?

Claudia Kelly
Simi Valley, CA

In answer to the first "situation" cited as we understand the conditions stated:

Pilot B *may* log the time during which he or she manipulates the controls of the aircraft flown as pilot-in-command in accordance with FAR § 61.51 (c)(2)(i).

Since Pilot B is not instrument rated, Pilot A *must be* pilot-in-command as defined under FAR § 1.1 (which identifies the pilot responsible for the operation and safety of an aircraft during flight time). It should be understood that although Pilot A is serving as "safety pilot" under FAR § 91.21(b), he or she must still be pilot-in-command under FAR § 1.1 and may log the time while serving as pilot-in-command in accordance with FAR § 61.51 (c)(2)(i).

In the second situation, the above circumstances are changed only by the flight conditions being changes to *actual* instrument meteorological conditions (IMC).

Pilot B may still log the time during which he or she manipulates the controls as pilot-in-command in accordance with FAR § 61.51 (c)(2)(i).

Pilot A *must* be pilot-in-command as defined in FAR § 1.1 and may, thus, log the time serving as pilot-in-command in accordance with FAR § 61.51 (c)(2)(i).

If Pilot "A" were to become a certificated flight instructor, he or she *must still be* pilot-in-command under FAR §1.1 and would then be serving a dual role as both *safety pilot* and *flight instructor* and may log the time as pilot-in-command under either FAR § 61.51 (c)(2)(i) or § 61.51 (c)(2)(iii) as he or she chooses.

The flight experience gained under the above conditions is creditable toward an instrument rating and should be logged in accordance with the specific guidelines of FAR § 61.51 (a), (b), and (c), (2), (4), and (5).

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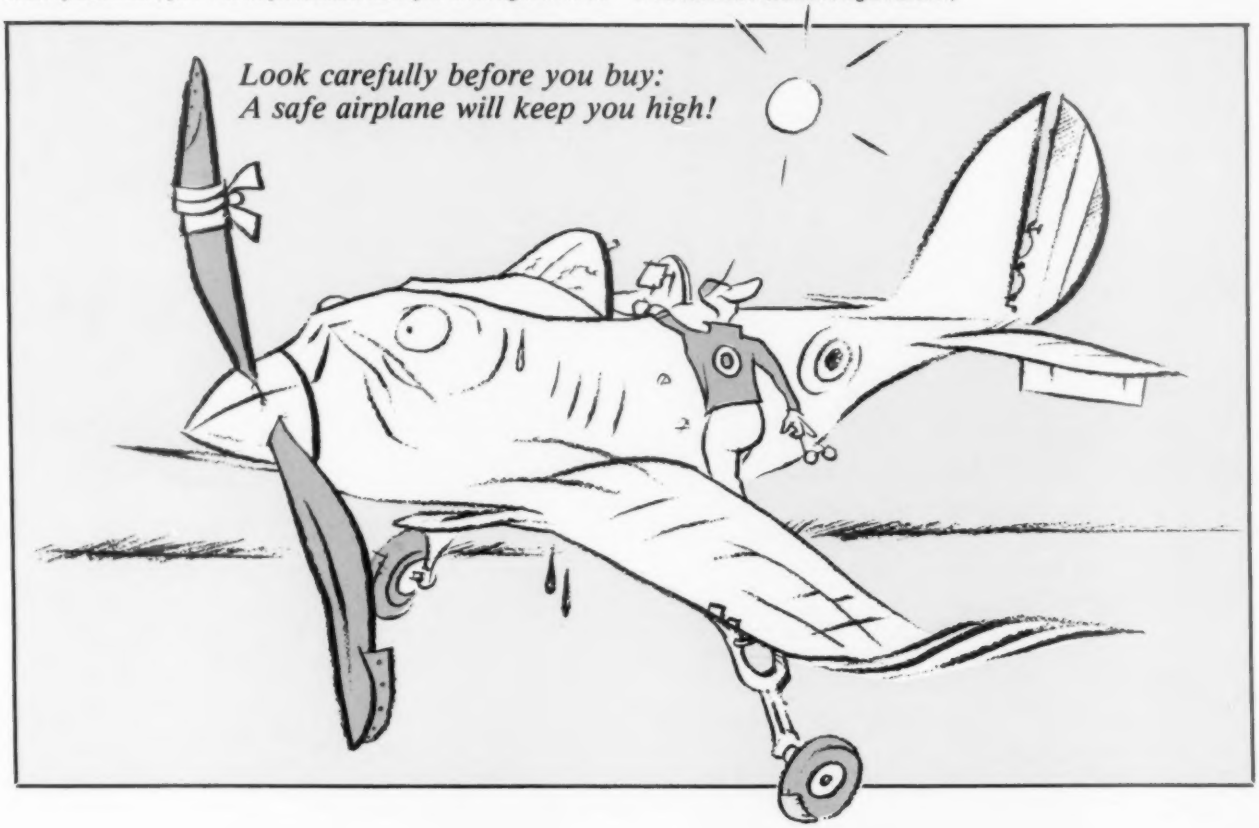
Until an aircraft or ground vehicle at the hold line is cleared by the tower to cross the hold line, the lights will remain red. When the tower gives an aircraft clearance to proceed beyond the hold lines, controllers will switch the hold line lights from red to green. This new combination of visual and oral communications could help decrease pilot/ATC mis-communication. (See p. 7 for an article on proper phraseology in pilot-controller communications.) Similar systems have been used in Europe for quite some time and seem to work well, and they have become an International Civil Aviation Organization standard. They may soon become a familiar sight at U.S. airports.

The bottom line in most of the accidents surveyed seems to be pilot complacency or inattention. Controllers, of course, are not blameless in this sort of problem. Any time you receive a taxi clearance or instruction which seems questionable, your PIC responsibilities allow you to disregard it in the interest of safety, after informing ATC of your intentions. The best ground (and midair) collision avoidance system is still you, the pilot.

However, by considering and following a few simple rules, you can increase your own operational safety on an airport. Always be aware of where you are on an airport and know the location of other airport traffic. Keep alert anytime you move your aircraft—not just during taxiing but also when moving it by a push bar or a motorized tug. Know the markings, signs, and lighting systems used on airports. Listen carefully to ATC instructions. If they are unclear, ask the controller to explain them. Remember, it is probably *you* who can best prevent close encounters of the ground kind.

See and avoid means on the ground, too. ■

(This article was prepared with the assistance of Leslie K. "Spike" Vipond, a Specialist in the Accident Prevention Program Branch.)